PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G06F 1/26 — A1

(11) International Publication Number: **WO 98/13743**

(43) International Publication Date: 2 April 1998 (02.04.98)

(21) International Application Number: PCT/US97/15458

(22) International Filing Date: 3 September 1997 (03.09.97)

(30) Priority Data:
08/722,605 27 September 1996 (27.09.96) US

(71) Applicant: ENERGY RESEARCH CORPORATION [US/US]; 3 Great Pasture Road, Danbury, CT 06813 (US).

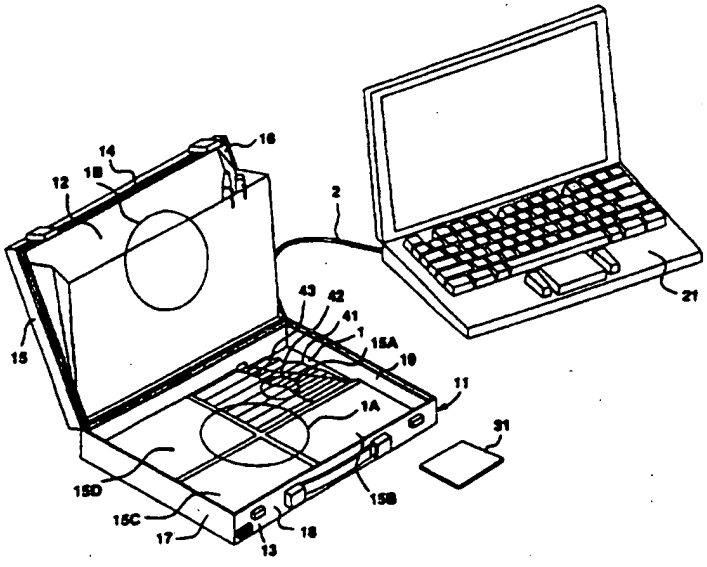
(72) Inventors: CHARKEY, Allen; 61 Longmeadow Hill Road, Brookfield, CT 06804 (US). COATES, Dwaine, K.; 110 Coalpit Hill B4, Danbury, CT 06813 (US).

(74) Agent: TORRENTE, John, J.; Robin, Blecker, Daley & Driscoll, 330 Madison Avenue, New York, NY 10017 (US).

(81) Designated States: CN, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.

(54) Title: BATTERY INCORPORATED INTO COMPUTER CARRYING CASE



(57) Abstract

A computer carrying case (11) having a battery assembly (1A or 1B) integrated into a panel or panels of the case.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

BATTERY INCORPORATED INTO COMPUTER CARRYING CASE

BACKGROUND OF THE INVENTION

This invention relates to a battery and, in particular, to a battery for supplying power to a mobile or laptop computer.

The mobile or laptop computer market has two major trends. One trend is towards smaller, lighter computers, such as palmtop computers, and the other is towards more powerful integrated functional systems, incorporating peripheral devices such as CD-ROM drives, cellular FAX/modems and color printers. These two trends are divergent with respect to system requirements and serve two specialized markets. Highly functional integrated systems serve a unique segment of the business market that actually rely on mobile computing, the "mobile office" concept.

The typical laptop computer has an operating time of two hours or less with currently available batteries which are housed in the computer. This brief run time greatly limits the usefulness of the device, and in fact may defeat the purpose of having a laptop.

A possible solution to the short operating run time, which becomes even shorter with the addition of peripheral devices, is to increase the energy storage capacity of the battery. This necessitates making the battery larger, thereby increasing the physical size and weight of the computer and is not an acceptable approach. Another approach is to carry along extra batteries. This approach is extremely inconvenient.

It is, therefore, an object of the present invention to provide a battery for a mobile computer which can be of higher power, but which does not necessitate increasing the size of the computer.

SUMMARY OF THE INVENTION

In accordance with the principles of the present invention, the above and other objectives are realized in a battery assembly formed as an integrated part of

one or more of the top, bottom and side panels of a carrying case for a mobile computer. In the embodiment of the invention to be disclosed hereinbelow, the battery assembly includes first and second nickel-zinc battery modules integrated into the top and bottom panels, respectively, of the case. Each battery module is of molded plastic form and includes a number of planar batteries each having insoluble roll bonded nickel electrodes.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features and aspects of the present invention will become more apparent upon reading the following detailed description in conjunction with the accompanying drawings in which:

FIG. 1 shows diagrammatically a battery assembly incorporated into a mobile computer carrying case in accordance with the principles of the present invention.

DETAILED DESCRIPTION

FIG. 1 shows diagrammatically a battery assembly 1 incorporated into a mobile or laptop computer carrying case 11, in accordance with the principles of the present invention. As shown, the battery assembly 1 includes two battery modules 1A and 1B formed as integral parts of the top and bottom panels 12 and 13 of the case 11. The case 11 further includes lightweight side panels 14-19 which can comprise plastic or metal and which complete the case 11.

A battery cable 2 permits the output of the battery modules 1A and 1B to deliver power to a computer 21 to be carried in the case 11. Since the battery modules 1A and 1B are integrated with the top and bottom panels of the case, the computer 21 can be operated while the computer is inside or outside the case. Also, since the battery modules are not stored within the computer 21, they can be designed for significantly increased power and run times, while not requiring an increase in the size of the computer. The increased power of the battery modules also permits peripherals, such as,

printers, CD-ROM drives, memory backup and fax modems to be used with the computer. Preferably, the battery modules 1A and 1B are of light weight molded plastic form. Also, preferably, the modules comprise planar, nickel-zinc batteries, having insoluble, roll bonded composite zinc electrodes and an improved electrolyte system. With this construction, the modules are low cost, light weight and extremely flexible, permitting easy integration into the case 11.

A microprocessor based printed circuit board 31 supported adjacent to the side panel 19 of the case is used to distribute and condition battery power for a variety of uses, as well as to provide state-of-charge monitoring for the battery assembly 1. The circuit board also communicates through the cable 2 directly with the computer 21 to provide battery data to the power management software resident in the computer. A battery charging function of the circuit board 31 allows the battery modules 1A and 1B to be charged from a variety of input sources, such as, U.S. or European A.C. line power or twelve volt D.C. power from an automobile battery. The battery modules 1A and 1B may also be used to power additional devices other than computer 21 such as cellular phones or be used to recharge batteries of other devices.

FIG. 1 also shows a detailed diagram of the bottom battery module 1B of FIG. 1. As shown, the battery module includes four batteries 15A, 15B, 15C and 15D formed as a prismatic four-battery monoblock providing six volts of power. With battery module 1A similarly formed, the case 11 provides a total of twelve volts D.C. power. Each of the batteries 15A-15D is comprised of a layered structure of a positive plate 41, a separator 42 and a negative plate 43 to form a cell pack. The packs are united into the four battery monoblock of molded plastic, so as to provide the needed strength to be used as the structural components of the respective top or bottom panel of the case 11. The

batteries 15A-15D of the monoblock thus have large flat surface areas which allow the batteries to be thin enough so as not to significantly increase the thickness of the case 11.

As can be appreciated, the battery modules 1A and 1B form the major structural components of the top and bottom panels 12 and 13 of the case 11, with the side panels forming the remaining framework of the case.

In all cases it is understood that the above-described arrangements are merely illustrative of the many possible specific embodiments which represent applications of the present invention. Numerous and varied other arrangements can be readily devised in accordance with the principles of the present invention without departing from the spirit and scope of the invention.

What Is Claimed Is

1. A case for carrying a computer, comprising:
top and bottom panels;
side panels attached to said top and bottom panels; and
a battery assembly integrated into at least one of said panels for providing power to the computer.

2. The apparatus of claim 1 wherein:
said one panel is one of the top and bottom panels.

3. The apparatus of claim 2 further comprising:
a further battery assembly incorporated into the other of the one of the top and bottom panels.

4. The apparatus of claim 1 wherein:
said battery assembly comprises a battery module including at least one battery supported in molded plastic.

5. The apparatus of claim 1 wherein:
said one battery is a nickel-zinc battery.

6. The apparatus of claim 5 wherein:
said nickel-zinc battery comprises a negative zinc electrode.

7. The apparatus of claim 6 wherein:
said negative zinc electrode is insoluble and roll bonded.

8. The apparatus of claim 5 wherein:
said one battery includes planar positive and negative electrodes with a separator therebetween.

9. The apparatus of claim 5 wherein:
said battery module comprises a plurality of batteries supported in a molded plastic monoblock.

10. The apparatus of claim 9 wherein:
each of said batteries of said monoblock is a nickel-zinc battery.

11. The apparatus of claim 11 wherein:
each nickel-zinc battery comprises a negative zinc electrode.

12. The apparatus of claim 11 wherein:
each said negative zinc electrode is insoluble and roll bonded.

13. The apparatus of claim 9 wherein:
each of said batteries includes planar positive and negative electrodes with a separator therebetween.

14. The apparatus of claim 9 wherein:
said plurality of batteries provide a six volt output.

15. The apparatus of claim 1 further comprising:
a microprocessor to control power management and power distribution of said battery assembly.

16. The apparatus of claim 1 further comprising:
a battery charger to charge said battery.

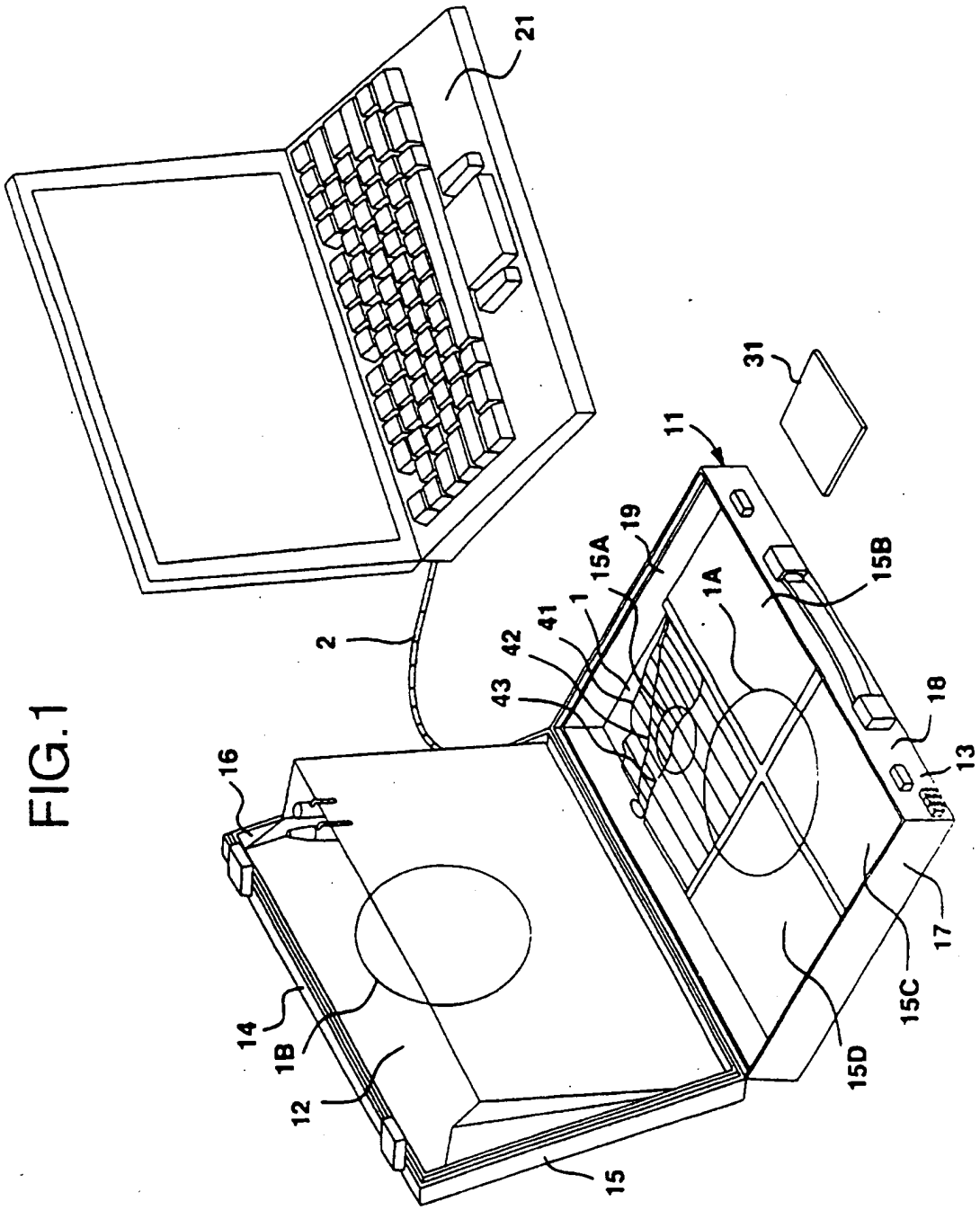
17. The apparatus of claim 16 wherein:
said battery charger carries out charge monitoring of the battery.

18. The apparatus of claim 15 wherein:
said microprocessor communicates directly with the computer and battery management software in the computer.

19. The apparatus of claim 1:
wherein said case has a power output to power other devices.

20. The apparatus of claim 1 wherein:
said case has a charge output to charge other devices and batteries.

FIG.1



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/15485 CS

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :G06F 1/26
US CL :395/750.08
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/750.08; 320/2, 6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS - search terms: battery pack#, (lap top or laptop or notebook or note book or portable)(w)computer, nickel-zinc(w)(batter### or cell#)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	US 5,475,626 A (VILETTO) 12 December 1995, figs.1-4 and 10 and cols. 3-4.	1,2,4,and 15-19 ---------- 3,5-10,13,14
Y	US 5,553,294 A (NANNO et al) 03 September 1996, abstract and fig.1.	3
A,P	US 5,630,155 A (KARAKI et al) 13 May 1997, abstract and figs. 1B,3A, and 3B.	1-20
A	US 5,039,928 A (NISHI et al) 13 August 1991, fig.5 and cols. 2-3.	1-20
A,P	US 5,563,493 A (MATSUDA et al) 08 October 1996, abstract and fig.8.	1-20

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 14 OCTOBER 1997	Date of mailing of the international search report 0 8 DEC 1997
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer GLENN A. AUVE Telephone No. (703) 305-3686

Form PCT/ISA/210 (second sheet)(July 1992)*